

## EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	456	(process\$3 analyz\$3 pars\$3) with quer\$3 same (sort\$3 group\$3 classif\$3 cluster\$3) same quer\$3 with (type\$1 dimension\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 13:01
L2	4	1 and concept near3 network	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 12:58
L3	72	(sort\$3 group\$3 classif\$3 cluster\$3) same (log\$1 journal histor\$4) near5 quer\$3 same (type\$1 dimension\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 13:04
L4	1	3 and concept near network	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 13:03
L5	1	3 and network near analysis	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 13:04
L6	5	(sort\$3 group\$3 classif\$3 cluster\$3) same (log\$1 journal histor\$4) near5 quer\$3 with (unit\$1 token\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 13:05
L7	7	(sort\$3 pars\$3 segment\$3 divid\$3) same (log\$1 journal histor\$4) near5 quer\$3 with (unit\$1 token\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 13:08
L8	26	(sort\$3 pars\$3 segment\$3 divid\$3) same (log\$1 journal histor\$4) near5 quer\$3 same (unit\$1 token\$1 subset\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 13:13
L9	48	(generat\$3 creat\$3 build\$3) same (concept near network network near analysis wiki) same quer\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 13:15

## EAST Search History

L10	1968	quer\$3 same (pars\$3 segment\$3 divid\$3) same (cluster\$3 unit\$1 token\$1 subset\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 13:16
L11	8	9 and 10	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 13:16

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Ref #	Hits	Search Query	Dbs	Default Operator	Plurals	Time Stamp
L1	68	(concept near network network near relationship\$1) same quer\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 16:46
L2	22	1 and @rlad<="20030404"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 16:56
L3	3098	(generat\$3 creat\$3 build\$3) same (relationship\$1 connect\$5 near (node\$1 site\$1 network)) same quer\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 16:56
L4	126	(generat\$3 creat\$3 build\$3) same (relationship\$1 connect\$5 near (node\$1 site\$1 network)) same using near quer\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:06
L5	35	4 and @rlad<="20030404"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:09
L6	1580	quer\$3 same (pars\$3 segment\$3 divid\$3) same (cluster\$3 unit\$1 token\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:17
L7	8	6 and (creat\$3 generat\$3 build\$3) same concept near network\$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:05
L8	8	6 and concept near network\$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:05
L9	390	6 and (generat\$3 creat\$3 build\$3) same (relationship\$1 connect\$5 near (node\$1 site\$1 network))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:19

## EAST Search History

L10	208	9 and (trend\$3 pattern\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:08
L11	311	9 and compar\$6	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:09
L12	179	11 and (trend\$3 pattern\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:09
L13	70	12 and @rlad<="20030404"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:09
L14	3562	quer\$3 same (pars\$3 segment\$3 divid\$3 sort\$3) same (group\$3 cluster\$3 unit\$1 token\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:22
L15	5	14 and (generat\$3 creat\$3 build\$3) same (structure with connect\$5 near (node\$1 site\$1 network))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:19
L16	937	concept near network\$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:21
L17	19	16 and 14	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/09/19 17:22

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We're going to try to break that patent application down into a little accessible english, Donna. Might take a day or more, but it's probably for people to get a good understanding of.

Posted by: [Bill](#) at April 21, 2005 12:57 PM [Permalink](#)

MT POWERED

That patent sounds very similar to the 'shard' or cluster organization data by Google I saw in a recent presentation.

Check out this presentation around the 45min mark.  
[http://www.search-engine-war.co.uk/2005/04/google\\_behind\\_t.h](http://www.search-engine-war.co.uk/2005/04/google_behind_t.h)

Posted by: [Teddie](#) at April 25, 2005 8:00 AM [Permalink](#)

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The "AND" operator is unnecessary -- we include all search terms by default. [\[details\]](#)

**Web**

Results 1 - 10 of about 7,240,000 for **concept network and query**. (0.15 seconds)

### Reranking Search Results Based Upon Concepts in Users' Queries ...

A **concept network** involves relationships between related **concepts**, and each unit in a search **query** can be found in a **concept network**. **Concept networks** are ...

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### Query-independent Customized Index Entry Formats in a concept ...

This article has illustrated, for a **concept-network-based** indexing system, one possible index entry format that is both customizable and **query** independent. ...

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### Concept search technology goes beyond keywords Information Outlook ...

A purely statistical technology cannot offer editing of the **concept network and query** expansion. Among other benefits, the ability of each user to edit the ...

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## CHAPTER 5 INFORMATION RETRIEVAL ISSUES

The resulting hypertext knowledge base (containing the **concept network** embedded within the document **network**) can be used for **query** analysis. ...

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### [PDF] A Real-time Integration Of Concept-based Search and Summarization ...

File Format: PDF/Adobe Acrobat - [View as HTML](#)

components, a **concept network**, a **query**, reformulation model, a standard search ... answer set, and at the same time pipes the **query**, to the **concept network** ...

[acl.ldc.upenn.edu/W/W00/W00-1319.pdf](http://acl.ldc.upenn.edu/W/W00/W00-1319.pdf) - [Similar pages](#)

### Title Index

2 (DSS 2) — User-network interface layer 3 specification for ... Link — **Concepts** for the User Interface of Extended Hyperlinks · The Lorel **Query Language** ...

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### December/January 2003 Bulletin: Wang Jun

A language for **concept query** and manipulation that will simplify operations on the **concept network** and add an automatic **query** expansion and contraction ...

[www.asis.org/Bulletin/Dec-02/jun.html](http://www.asis.org/Bulletin/Dec-02/jun.html) - 40k - [Cached](#) - [Similar pages](#)

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### Yahoo!'s Concept Network & SuperUnits

Units in the **concept network** that have some similar characteristic(s) are grouped ... A **query** is processed by identifying constituent units, determining the ...

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**GRIDtoday: CONCEPT FOR EXTENDING THE REMOTE NETWORK FILE SYSTEM ...**

The **concept** proposed through the sensor-controlled **network**, ... **network** looks up these resource definitions to **query** resource objects in the enterprise grid ...  
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Result Page: 1 2 3 4 5 6 7 8 9 10 [Next](#)

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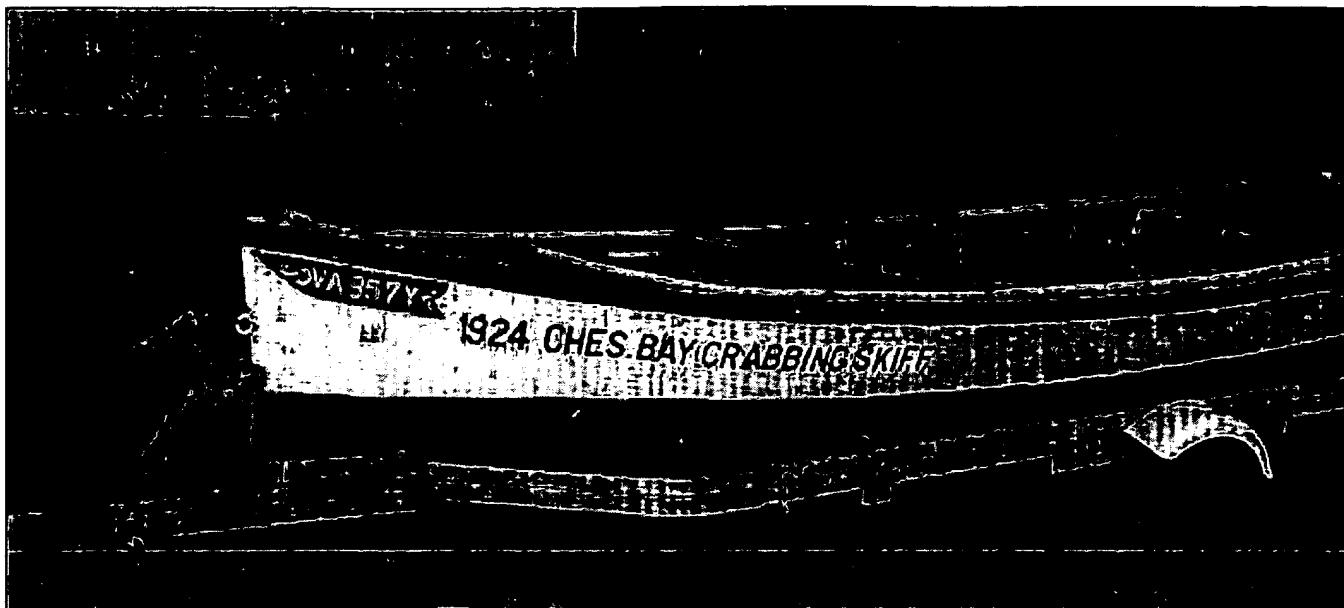
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## SEO by the Sea

*On the web, to make reference without making a link is possible but ineffective - like speaking but with a paper bag over your head. - Tim Berners Lee, in Links and Law: Myths*

**Monday, September 18th 2006**

### Reranking Search Results Based Upon Concepts in Users' Queries

*posted @ 5:46 am in [ [Search Engines and Directories](#) ] by William Slawski*

Can user queries be used effectively as feedback, to rerank search engine results? Possibly, if they can be understood as concepts first.

Search queries can be decomposed into constituent parts referred to as units. A query processing engine decomposes a search query into units using statistical methods. A unit is one or more word sequences that typically corresponds to a natural concept such as "New York City" or "bird of prey."

According to [Unity: relevance feedback using user query logs](#), Yahoo has been using Concept Units generated from searcher's queries as one of the inputs in their *Also Try* feature to display refined results since spring of 2003.

The paper describes the live testing of search results reranking based upon "concept units" on a small percentage of Yahoo users for a period of a week. This idea of concept units has appeared in other patent filings from Yahoo, and the kind of reranking based upon concept units was the focus of a patent

application that was published last week. The quote above is from that document.

### Reranking and increasing the relevance of the results of Internet searches

Invented by Shyam Kapur and Jignashu Parikh

Assigned to Yahoo

US Patent Application 20060206476

Published September 14, 2006

Filed: March 10, 2005

#### Abstract

Techniques are provided for reranking and increasing the relevance of the results of Internet searches. A search query is initially parsed into individual units. Each unit corresponds to one or more words that represent a natural concept. A concept network is analyzed to locate concepts that are related to the units in the search query. Particular concepts are selected from the concept network. Independent Internet searches are performed for each of the selected concepts. The search results from these searches are then compared to units in the original search query and ranked according to their relevance to the original search query.

The basic idea behind the patent application is that it aims at making search results more relevant to a user's intent. It would do this by reranking search query results by determining the relevancy of the search results to units, unit associations, and unit extensions in those search queries.

#### A Summary Before Reranking

1. Search query parsed into individual units using statistical methods.
2. Each unit is one or more words representing a natural concept such as "New York City" or "bird of prey."
3. The search engine retrieves content from the web matching a search query and sends those results to a page assembler.
4. The page assembler sorts the results by their relevance to the query and presents them in an order most easily displayed to a searcher, in a search result display screen.

Some queries may contain more than one unit, which could be merged together if they are "extension units." Here are the different types mentioned in the patent filing:

- 1) Associated units - two or more units in a query, not sufficiently related to form a new unit.
- 2) Extension units - two or more units in a query sufficiently related to form a new unit.

#### Related Patent Filings from Yahoo!

The idea of using concept units, and concept networks based upon searchers queries appears in a good number of patent filings from Yahoo. The earliest was granted in May of this year, and the latest two were published on September 14th. While this post covers one of those newest filings, the patent application focuses more on paid search results and a link to it appears at the bottom of this list.

A good percentage of discussion about search engine optimization on the web considers content and links, without delving too deeply into how a search engine may look at matching queries to pages. If you want to dig deeper into how Yahoo might use concept units, It would help to look at these.

- Systems and methods for generating concept units from search queries - 7,051,023 - Patent Application Published October 7, 2004 - Patent Granted May 23, 2006
- Universal search interface systems and methods - 20040249801 - Published December 9, 2004
- Systems and methods for search processing using superunits - 20050080795 - Published April 14, 2005
- Systems and methods for search query processing using trend analysis - 20050102259 - Published May 12, 2005
- Search processing with automatic categorization of queries - 20060122979 - Published June 8, 2006
- Automatic generation of taxonomies for categorizing queries and search query processing using taxonomies - 20060122994 - Published June 8, 2006
- Systems and methods for managing and using multiple concept networks for assisted search processing - 20060167896 - Published July 27, 2006
- System for modifying queries before presentation to a sponsored search generator or other matching system where modifications improve coverage without a corresponding reduction in relevance - 20060206474 - Published September 14, 2006

## Concept Networks

A concept network involves relationships between related concepts, and each unit in a search query can be found in a concept network. Concept networks are used to identify concepts that are related to the search query units.

After a search query unit has been located in a concept network, related concepts in that concept network are selected. A concept network links to related concepts using a number of techniques. Here are ways that concepts in a concept unit might be related to each other:

- concepts that are synonyms,
- concepts that have a more specific meaning,
- concepts that have a more general meaning,
- specific real-life examples of the concept, and;
- well-known terms or names that sound similar to the concept or use some of the same words.

### Example

A unit in a search query is “skyscraper.”

The system locates the concept “skyscraper” in the concept network and identifies related concepts:

- More general terms - such as “building” and “edifice.”
- Similar terms - such as “high rise.”
- Specific examples - such as “Empire State Building.”

### Building Concept Networks from Frequency of Past Queries

Search queries previously submitted can be looked at to determine how frequently the related concepts appeared together in those queries. A concept network can be built by linking concepts that have appeared together.

### Session Based Concept Networks

Concept network can be based on concepts that appear together in queries submitted by all users. A concept network can be a session based concept network, linking concepts that appeared together in search queries submitted by one particular user, or a group of users.

Examples of session based concept networks.

The main concept “jaguar” can be linked to the following car related concepts because a particular user’s past queries linked them together:

- Luxury automobile,
- XYZ Car Company, and;
- Car racing.

A different user may have submitted prior queries showing an interest in jaguar animals. That user creates a different concept network linking “jaguar” to animal related concepts like

- cat,
- zoo, or;
- safari.

### Burstiness and Concept Networks

A concept network may link concepts appearing together most frequently in previous queries submitted during a specified time period by one or more users.

Example of a time limited concept network:

In this example, a concept “Jane Doe” is linked to the related concepts:

- Jane Doe Live Performances,
- Jane Doe Music CDs, and;
- instrumental music.

These related concepts are the concepts that appeared most frequently with “Jane Doe” in previous search queries over a specified time interval, which could be the past 24 hours, the past week, or the past month.

Imagine in that example, the concept network is from concepts related to a singer named Jane Doe based on the most popular search queries in the past 24 hours.

Now, during a later 24 hour period, the most popular search queries including “Jane Doe” may relate to a politician with the same name.

If that happens, the concept network for “Jane Doe” could be changed to include links to the related concepts “Jane Doe US Senator” and “Doe Initiative.”

This burst of new queries relating to what seems to be a different intent behind searching for “Jane Doe” results in the concept network being updated to include concepts that appeared most frequently in recent queries with the unit “Jane Doe.”

## Selecting Concepts for reranking

This selection process can be based on a number of different criteria.

Examples:

- The top five most frequently occurring related concepts from the concept network can be selected, or;
- The top 50% or the top 25% of the most frequently occurring related concepts can be selected, or;
- Many other selection techniques could be used.

## Using Direct and Indirect Connections in Concept Networks

The most closely related concepts from the concept network are selected. Those could be all concepts that are directly linked to the main concept in the concept network.

Other concepts can be linked to the main concept indirectly through one of the directly linked concepts, such as an indirect connection between the concepts “Jane Doe” and “violins” through “instrumental music.”

## Searches Based upon Selected Concepts

Once concepts are selected from the concept network for units in a query, independent web searches are performed for one or more of the related concepts.

If there are four units in a search query, and one related concept is selected for each unit, then four independent Internet searches are performed.

If a large number of related concepts are selected, then web searches are only performed for a subset of the concepts. So, if 20 concepts are selected, searches might be performed for only the top 5 concepts that are related to all of the units in a search query.

The search engine performs the independent web searches for the concepts selected, and it can be performed using any well-known Internet searching techniques (such as using Google or Yahoo! search technology).

Separate sets of search results are retrieved for each of the individual Internet searches performed by search engine, and those are sorted according to their relevance to each related concept.

## Reranking Based upon Additional Concepts

Reranking the search results retrieved from the web searches then happens by taking those results and the results from a search performed on the entire original search query.

Each of the search results are compared to the units, unit associations, and unit extensions in the original search query, and each result is assigned a rank or score based on its relevance to the original search query.

## *Assigning a Score*

The search results are analyzed to determine how often the units, the associations of units, and the unit extensions from the search query appear in the search results, and assigned a score based on the frequency (or relative frequency) that instances of those appear in the search results.

The more appearances, the higher the score. That score is used to rerank the results.

### *Navigational Queries*

Search results received from certain types of queries may be given higher scores.

For example, results retrieved from navigational queries can be ranked more highly than search results retrieved from other types of queries. Those higher scores for navigational queries are based on an assumption that navigational queries generally retrieve more relevant search results.

### *Sorting Based Upon Scores*

Once rerank scores are assigned to each of the search results based on their relevance to the original search query, the search results are sorted from highest rerank scores to lowest rerank scores.

The highest rerank scores should point to content most relevant to the original search query, and the results with the lowest rerank scores should be content least relevant to the original query.

This process increases the relevance of search results by locating content matching concepts related to units in the search query. The search results are then combined with search results from a standard web search based on the entire search query and sorted according to their relevance to the search query.

### *Assumptions Behind Reranking*

The concept network is used to increase the number of search results retrieved during a search.

This should result in at least some of the search results being likely to be highly relevant to the search query and to the user's intent. This expansion should enable the search engine to identify a larger number of relevant search results.

In effect, this also provides a feedback loop into a search, by seeing what searchers have been looking for in units found in their queries, which are identified in search query logs. Using a time interval, like mentioned above, may return results that are pretty timely.

## **Conclusion**

Results from searches on related concepts can be used to add to results and rerank results from the original search query. They could also be presented as related searches or inserted into the original results at predetermined intervals.

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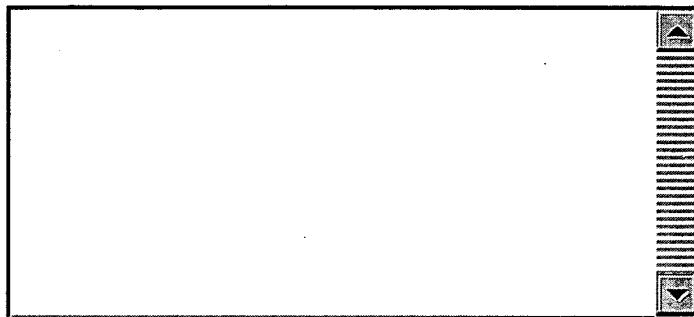
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- Newark, Delaware



- o Temp: 72°F
- o Humidity: 88%
- o Wind: WNW at 5 kt
- o Dew Point: 68°F
- o Barometer: 29.72" Hg (1006 hPa)
- o Clouds: overcast
- o Conditions: light rain & mist
- o Visibility: 2 1/2 miles



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HiFi — Network-centric **query** processing in the physical world ... and describe an initial proof-of-concept prototype that is capable of combining data from ...  
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The **concept** is simple: an 802.11 mesh **network** comprised of high-end nodes, ... "The ultimate goal of TinyDB is to allow people to **query** sensor **networks** ...  
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Chen, S. -M., Horng, Y. \*J.: Fuzzy query processing for document retrieval based on extended fuzzy **concept networks**. IEEE Transactions on Systems, Man, ...  
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**April 21, 2005**  
**Yahoo!'s Concept Network & SuperUnits**

Bill Slawski started a thread over at Cre8asite Forums named [Superunits: of signatures and co-occurrence](#). In that thread, he claims a new patent Yahoo! Search released (on April 14th) named [System and method for search processing using superunits](#).

Here is the patent's abstract:

In a search processing system, a concept network is generated from a set of queries by parsing the queries into units and defining various relationships between the units based in part on patterns of units that appear together in queries. Units in the concept network that have some similar characteristic(s) are grouped into superunits. For each superunit, there is a corresponding signature that defines the similar characteristic of the group. A query is processed by identifying constituent units, determining the superunit membership of some or all of the constituent units, and using that information to formulate a response to the query.

Bill tells us to look for "some new vocabulary words - a concept as a unit, a superunit, and signatures." I briefly skimmed it, but the concept network seems very interesting. "A concept network is generated from a set of queries by parsing the queries into units and various relationships between the units, e.g., based on patterns that appear together in queries."

Posted by [rustybrick](#) in [Yahoo! Search Optimization](#) at April 21, 2005 9:21 AM | [Comments](#) [Top](#)

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produced by one of those auto-spam generators, where it uses the keyword phrases chosen in a random meaningless way - but in a way that fools the engines into thinking it makes sense. :)

Posted by: Dazzlindonna at April 21, 2005 10:16 AM [Permalink](#)

No one can fool Yahoo!

Posted by: Barry Schwartz at April 21, 2005 10:28 AM [Permalink](#)

"Concept network, a unit, a superunit, and signatures" are not new. If you read between lines, co-occurrence theory of set units and d memberships can be seen all over the patent.

Orion

Posted by: Orion at April 21, 2005 12:43 PM [Permalink](#)

My thoughts exactly, Orion. I expected to see the word "co-occur" somewhere within the patent after reading through part of it, and was surprised to see it, too.

These are not new things. But, they are concepts that people should be learning more about.